June 1, 1965 N. MARCHAK 3,186,601

LEAKPROOF DISPENSING TUBE

Original Filed July 7, 1961

Fig. 1

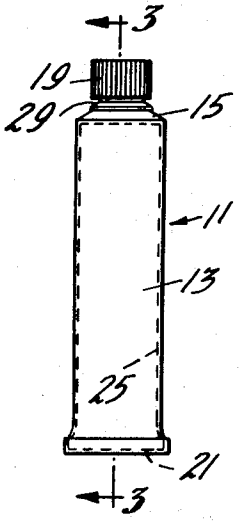


Fig. 2

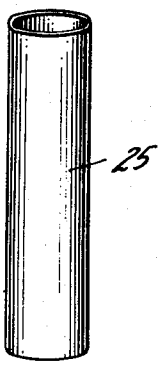
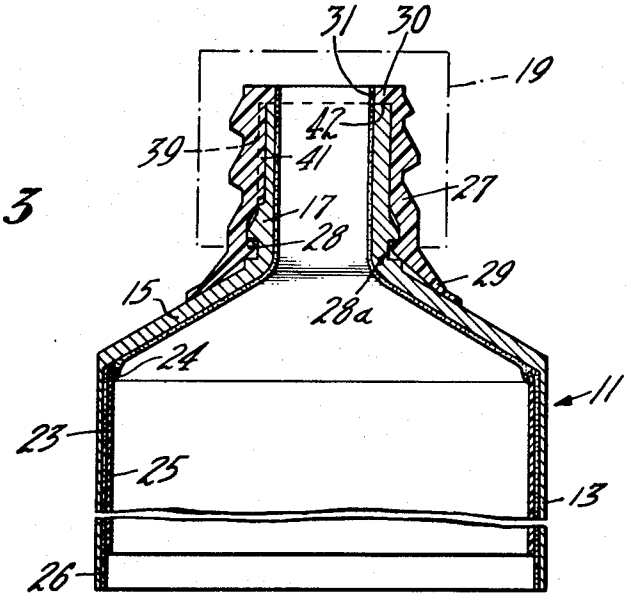


Fig. 3



INVENTOR.
NICHOLAS MARCHAK
BY
Leonard R. Koban
Louis F. Heeb
ATTORNEYS

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LEAKPROOF DISPENSING TUBE

Nicholas Marchak, Martinsville, N.J., assignor to American Can Company, New York, N.Y., a corporation of New Jersey

Continuation of abandoned application Ser. No. 122,549, July 7, 1961. This application July 7, 1964, Ser. No. 380,813

5 Claims. (Cl. 222—107)

This invention relates to containers and especially to containers of the collapsible tube type designed to dispense the contained product when squeezed. This application is a continuation of my co-pending application, Serial Number 122,549, filed July 7, 1961, now abandoned.

Containers of this type are conventionally used for viscous or paste products such as tooth paste and are usually formed of metal by impact extrusion from a small disc or slug, making a container with a very thin flexible side wall and a somewhat thicker head. The metal used for this process is usually lead, tin, or aluminum, and the thin walls of these materials sometimes crack during use of the tube with the result that the tube contents is extruded at inappropriate places during subsequent squeezings with obvious inconvenience to the user. It is also found that products having certain properties, especially those which are acid in character such as fluoride-containing tooth paste tend to attack the metal of the tube and may shortly strike clear through the thin side wall, thereby causing similar leakage during use.

In order to offset the latter tendency and also to avoid product discoloration which sometimes results from the attack of the metal by the product, it has been known to coat the inner tube surface with a soft layer of hydrocarbon wax such as paraffin or microcrystalline wax. While this offers some relief from the problems encountered, it is difficult to assure complete coverage by such a coating. Frequently, in spite of the utmost care in coating, pinholes develop resulting in the aforementioned leaks, and in any event the more severe effect, i.e. cracking of the tube due to ordinary manipulation is not counteracted by this expedient.

It is an object of the present invention, therefore, to provide an improved method of preventing the inconvenience resulting from the cracking of the thin walls of collapsible metal tubes, and incidentally to prepare a novel container for a metal-attacking product having more clearly assured resistance to penetration of the wall.

Another object of the invention is the provision of an improved container embodying in combination the foregoing improved side wall protection together with improved protection of the product from the possibility of discoloration by its reaction with metal at the breast and neck surfaces.

One feature of the present invention is the provision of a close-fitting flexible impervious tubular sleeve within the container, the sleeve being made of inert plastic material.

Another feature is the use of such a sleeve alone or in various combinations with a plastic neck insert or outsert, in some cases with a coating or partial coatings applied to the interior of the container or a portion thereof.

A further object of the invention is the provision of a collapsible metal tube having a coating on the interior thereof and a plastic outsert over the tube neck wherein a seal is formed at the juncture of the end of the neck and the outsert to prevent leakage of product within the tube between the neck and the outsert.

Additional objects, features and advantages will appear hereinafter as the description proceeds.

In the drawing:

FIG. 1 is a side elevation showing a tube according to the present invention.

FIG. 2 is a perspective view of the plastic sleeve employed in making the tube of FIG. 1.

FIG. 3 is a telescoped section, to a larger scale, taken on line 3—3 of FIG. 1 with the cap indicated in phantom, and before the bottom is closed by crimping.

Referring to the drawing, the present invention relates to a metal collapsible tube 11 (FIGS. 1 and 3) having a thin side wall 13 and an integral thicker breast 15 and neck 17, all formed at one time in a known manner by impact extrusion from a slug of a ductile metal such as lead, tin or aluminum. Such tubes are normally closed at the neck by a threaded cap 19 and, after filling are closed by crimping as at 21.

When the product to be placed in the tube is reactive, it has sometimes been found expedient to provide an interior coating of wax, preferably paraffin, here indicated by reference character 23, FIG. 3.

According to the present invention a flexible plastic sleeve 25 of tough inert material such as polyethylene is inserted into the tube from the bottom end. This sleeve is so made as to be close friction slip fit with the tube wall and is forced into the tube as far as it will go. This sleeve is made as diaphanous as possible while still retaining certain self-sustaining properties, and has been found to work effectively when made of branched polyethylene and extruded at a thickness of from .003 inch to .010 inch, .006 inch having proved especially effective. As can be seen from FIG. 3, if the wax coating 23 is provided, the innermost edge of the sleeve may strike into the margin of the wax coating and form a seal therewith, as indicated at 24. Thus, the interior surface protection may be uninterrupted. The sleeve 25 is preferably of a length slightly shorter than the tube wall 13 so that a metal skirt 26 of substantial length will extend beyond the bottom end of the sleeve 25. It has been found that this arrangement makes it possible to effect a tight crimped seal which will not tend to open when the tube is squeezed to dispense, whereas the presence of the sleeve margin in contact with the ultimate tube margin makes the formation of a reliable crimp very difficult, if not impossible.

In order that a reactive product such as fluoride-containing tooth paste will not be discolored by contact with exterior metal surfaces at the tube neck during use of the tube, it is customary to provide plastic neck attachments of the type shown, for example, in U.S. Patent 2,431,279. However, since the placement of neck attachments which must be held by swaged collars on the tube, as in that patent, is rather a complex and costly assembly operation, I prefer to use in the combination of this invention, a resilient plastic outsert 27 which is arranged to snap into place over the tube neck 17 and by means of its slightly deflected base flange 29 present a smooth finished appearance to the tube neck. As shown in FIG. 3, an upper flange 30 of the outsert 27 is preferably so located as to overlie the upper end of the tube neck 17 with a dispensing opening face 31 substantially co-extensive with the interior surface of the neck 17. The details of the outsert 27 are set out in particular in copending application S.N. 96,505, now Patent No. 3,144,964, filed March 17, 1961 by Goff et al., and include a locking bead 28, receivable into a groove 28*a* in the neck 17 with a snapping action to hold the parts assembled with the base flange 29 pressed and slightly deflected against breast 15. The neck 17 and outsert 27 also include matching preformed toothed configurations extending continuously therearound so as to mesh automatically when the outsert is put in place and prevent relative rotation between the outsert and neck when the cap 19 is being applied or removed. The toothed configuration on the neck is designated 39 and that on the outsert 41.

If desired the sleeve 25 may be joined to the container wall 13 by heating the container slightly after the sleeve

is in place. This will cause adherence between the coating 23 and the sleeve 25 to hold the latter even more firmly.

The coating 23 extends continuously up through the interior of the neck 17 and over the face 31 of the outsert 27. Thus the juncture 42 between the upper end of the tube neck 17 and the upper flange 30 of the outsert 27 is effectively sealed to prevent leakage of any product within the neck 17 into the juncture 42.

The resulting combination presents a container which is both neat in appearance and effective in operation, the entire interior surface so far as it comes into contact with the product, and the neck interior, both being effectively guarded against attack by the product even though the latter may be reactive. Primarily, however, the cracks which often occur due to the wrinkling of the wall 13, when squeezed during use, will be prevented from allowing the extrusion of the product at undesired points. This is because the tough sleeve 25 will not rupture in spite of any openings formed in the tube wall 13.

While the foregoing description has proceeded on the basis of providing a container entirely shielded from attack by a corrosive product, it will be understood that the principle of operation of the sleeve 25 is equally effective to forestall the inconvenient effects of wall cracks in any circumstance, and may be used with equal value even if the coating 23 and/or outsert 27 are omitted.

When a container of the collapsible metal tube type is prepared in accordance with the arrangement described above, it may be filled with a product, sealed in the usual manner by crimping the open end and then used by squeezing without taking special care in handling. If cracks should develop in the metal side wall of the tube, as frequently happens, the sleeve 25 prevents the same from actually becoming a leak through which the product can be inadvertently extruded.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made in the form, construction, and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A collapsible tube type container, comprising:
a metal body including a cylindrical shell portion and an integral headpiece having a breast portion terminating in a neck;
a thin film protecting seal on the inside of said headpiece;
said film seal also extending continuously down a portion of the inside of said shell portion in underlying relation to a unitary self-sustaining thermoplastic sleeve fitted within said body;
and said sleeve fitted within said body shell portion only and having its inner end sealed against said film seal to provide a barrier for direct contact with a product to be held in said container.

2. A collapsible tube type container, comprising:
a metal body including a cylindrical shell portion and an integral headpiece having a breast portion terminating in a neck;
a plastic outsert covering the exterior of said neck including the outer end of said neck;
said outsert having a dispensing opening face adjacent said outer end of said neck;
a unitary self-sustaining thermoplastic sleeve fitted within said body shell portion only;
and a thin film seal on the inside of said headpiece, said film seal overlapping the inner end of said sleeve and extending up through said neck and over said dispensing opening face thereby providing a seal between said neck and said face.

3. A collapsible tube container, comprising:
a metal body;
an integral headpiece at one end of said body, said headpiece having a breast portion terminating in a neck;
a plastic outsert covering the exterior of said neck and also overlying the outer end of said neck;
said outsert having a dispensing opening face substantially coextensive with the interior surface of said neck;
and a thin film coating on the inside of said headpiece extending up through said neck and over said dispensing opening face, thereby providing a seal between said neck and said face.

4. The container of claim 3 wherein said thin film coating is wax.

5. A collapsible tube type container, comprising:
a metal body including a cylindrical shell portion and an integral headpiece having a breast portion terminating in a neck;
a plastic outsert covering the exterior of said neck and overlying the outer end of said neck;
said outsert having a dispensing opening face adjacent said outer end of said neck;
a continuous thin film seal on the inside of said headpiece and said dispensing face;
and a unitary self-sustaining thermoplastic sleeve fitted within said body shell portion only and having its inner end sealed against said film seal to provide a barrier for direct contact with a product to be held in said container.

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LOUIS J. DEMBO, *Primary Examiner.*